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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/075,244	02/15/2002	Hiroyuki Nakano	501.41175X00	7857
20457	7590	11/05/2003	EXAMINER	
ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-9889			PADGETT, MARIANNE L	
			ART UNIT	PAPER NUMBER
			1762	

DATE MAILED: 11/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/075,244

Applicant(s)

Nakano et al

Examiner

M.L. Padgett

Group Art Unit

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— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- ☒ Responsive to communication(s) filed on 7/14/03 & 9/26/03
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 1-35 is/are pending in the application.
- Of the above claim(s) 19-35 is/are withdrawn from consideration.
- ☐ Claim(s) _____ is/are allowed.
- ☒ Claim(s) 1-18 is/are rejected.
- ☐ Claim(s) _____ is/are objected to.
- ☐ Claim(s) _____ are subject to restriction or election requirement

Application Papers

- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d). (paper #5, received 6/10/02)
- ☒ All ☐ Some* ☐ None of the:
- ☒ Certified copies of the priority documents have been received, however as the filing date of JP 2002-043083 is 2/20/02 after the US filing date - this claim is mute.
- ☐ Certified copies of the priority documents have been received in Application No. _____
- ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____

Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 6(9/26/02)
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other _____

Office Action Summary

1. Applicant's election with traverse of Group I, claims 1-18 in Paper No. 8 are acknowledged. The traversal is on the ground(s) that they apparently believe that potential uses of the apparatus must be claimed in order to be relevant to the restriction. This is not found persuasive because ways that an apparatus may be used need not be claimed in order for them to be considered, as method limitations in an apparatus claim only provide structural limitations to the extent that the apparatus must be capable of the action, but at the same time they do NOT exclude the capability of use for alternative process that may effectively employ the same structure.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 3-4, 6, 9-10 and 12-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 is unclear, because it is unknown how any thing can be received, i.e. detected, at the detector, before it is detected. This claim limitation is self-contradictory. Also, what is intended by "a speckle pattern" in line 2 is uncertain, however as refraction and interference patterns made by light, may be considered to have speckled light patterns, they will be considered to read on this limitation.

Furthermore, it is noted that when something is "imaged", it is made into or made to form a pattern, i.e., imaging is an active process of changing the input (? the reflected light pattern?) to a desired out put (to what? One does not usually alter the collected input before one has a chance to extract meaning from it!). As such a meaning appears contrary to logical and probably intended meaning, the examiner assumes that a slightly or subtly different meaning was intended, such as optical system receives the image of the reflected high. Note these uncertainties also apply to claim 4, which does not clarify them, and to a lesser extent to claim 10.

In claim 6, line 3 “the reflected light image” lacks any clear antecedent basis due to inconsistent terminology, as independent claim 1 did not require the image of the reflected light to be detected, but any means of detecting or quality of that light, could read on claim 1’s limitation, of which claim 6’s “...image” is only one possibility, not necessitated by previous language. Therefore, it is uncertain or ambiguous whether this is intended to be a new limitation, despite the use of “the”, or the previous limitation of claim 1 was intended to be narrower.

In claim 9 (and 15-15) “the intensity modulated frequency component” would appear to refer to the frequency of the intensity modulated light beam (i.e. pulse) of claim 8 (or 14), but as this is a value imposed from outside, it is unclear how it can give information on chamber wall contamination. If something else is intended by “...component,” it is undecipherable from the claim language, and further elaboration or more concise terminology may be desirable.

In claim 12, exactly what is intended by “branching reflected light” is uncertain, as the phrase is neither standard scientific terminology, nor idiomatic English. While it is known to “split” light beams or sources of light, so that the light follows two paths, reflection of light from different surfaces can also cause “scattering,” either of these words are among possible means of “branching” and “branched” in claim 12, especially as in line 12 “the indication” lacks proper antecedent basis, so that it is unclear what it necessarily refers to, i.e. the light beam, the reflected light, etc., so that when the “branching” occurs is unclear. If “branching” means split, is the light being split before its reflected so as to be directed to the gas to detect foreign materials, and the wall for contaminants, or is there only one output of light from the chambers, that include all the reflected light, which is then split and perhaps sent to different detectors, or the like. If “branching” is scattering, is all the reflected light just analyzed for the different information according to its effects? Claim 17 does not simplify or clarify this problem (note claim 12 has no “the irradiation step” referred to in 17, so consistent nomenclature may clarify some problems). In claim 18,

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line 4, "the scattered reflected light component" lacks antecedent basis. Is this some relationship to the branching?

3. While discrepancies in article usage for defining antecedent basis are no longer considered 112, 2nd problems as a matter of course by order of PTO-1700 management, applicant may wish to consider proof reading and modifying their claim language to employ standard antecedent basis article usage to improve their claim clarity, as there are numerous limitations, such as "a plasma," "a detector," etc., which are introduced multiple times without differentiations. While such limitations may all refer to the same limitation for each occurrence, they may also be considered to read on different ones.

In claims 8 and 14, while what the "desired frequency" is a parameters of, is not explicitly defined, the phrase "a light beam intensity-modulated by...frequency," is taken to mean that the light beam is being pulsed, and it is the pulse frequency which is being referred to.

Claim 7 appears to recite an inherent property of reflected light, and requires no irregularities (of unspecified type) to necessarily be present, hence requires no necessary variation to occur.

4. Applicant's IDS of September 26, 2003 (Paper No. 6) is made of record. It is noted that Ecchu et al (03-025,355) and Kawasaki (57-118,630) may relate to the limitation of claims 12-15 concerning suspended particles detection, but it is unclear if applicant's terminology concerning "light beam intensity modulation by a desired frequency" has the same meaning or not.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

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Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakano et al (11-330053) or Nakada et al (11-251252), and Bennett et al (JP03-147317 or US 5,367,139), in view of Katsuyama et al (11-340196).

Translations of all applied Japanese references have been ordered, but not yet received by the examiner.

The English abstracts of Nakano et al and Nakada et al indicate that as claimed pulsed light or light beams intensity-modulated by prescribed frequencies are employed to monitor suspended particles in a plasma, where the signals are separated to extract claimed "components" and relevant information; or the detected signal is referred to as having been split to obtain like information. This splitting and separating language may also be considered to read on filtering out light from other sources, as does the teaching of eliminating background noise. Neither Nakano et al nor Nakada et al's abstracts have teachings on monitoring chamber wall contamination, nor explicit teachings on using the monitored results of particulate contaminants for anything, however the taught real-time monitoring implies the desire to use it to mitigate the problem of particles, at the minimum to determine when cleaning is necessary, or there would have been little point in real-time monitoring.

Katsuyama et al is related to the teachings of Nakano et al or Nakada et al, in having overlapping teachings on suspended particle detection in a plasma atmosphere, however the abstract and Fig. 1 shown therewith, also indicate that during the measurement, sediment 33 on the chamber walls is detected, and separated out from the suspended particles monitoring systems. Therefore, it would have been obvious to one of ordinary skill, that in order to achieve an accurate signal/measurement of suspended particles, the

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reflected light returned from the chamber wall surface would need to be included in (or as well as) the noise elimination, etc., in Nakano et al or Nakada et al.

The Japanese abstract to Bennett et al, which also concerns contaminate detection and explicitly discusses removing particulate contaminants from the plasma chamber, also uses a laser scanning technique and detectors for the scattered light, specifically mentions detection and removal of contaminate on the chamber wall, used in the overall process, hence it would have been obvious to one of ordinary skill to also measure the wall contamination in the above combination, as Bennett et al shows it is also an important factor in plasma processing cleanliness, and Katsuyama et al shows that the signal or relevant information may be effectively separated. If one can separate them, one can also separately process. Bennett et al (JP) provide the motivation to do so, as well as providing further motivation to explicitly use measured data in controlling processing condition.

Bennett et al (US), which is the patent resulting from priority document of the Japanese patent to the same, is equivalent or (may be considered as a translation thereof) to the Japanese reference, with special attention directed towards the abstract, Figures 1 and 6, reference Nos. 38-40, which depict the laser light scattering detection system for imaging results analyzing contamination levels in the chamber, and on the walls, with discussion thereof found on column 5, lines 9-20; & column 10, lines 50-64. Bennett et al teach that the use of this system is to determine effectiveness of cleaning methods, and when the plasma "tool" is sufficiently clean for manufacturing use. As the bulk of the patent is directed to various cleaning techniques, this clearly suggests its use in controlling such processes, so the above arguments applied to the Japanese equivalent, also applies to the US Patent.

7. Other art of interest and cumulative to the above rejection included Bonin et al (US 5,943,130) which uses laser scanning near the substrate (i.e. suspended particles) and detects either forward or backward (implies and shows same window as input) scattered light, and observes pulses; and

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Dybas et al (US 5,225,089) that similarity uses scanned laser light and an opposed video camera detector for particle detection.

8. Any inquiry concerning this communication from the examiner should be directed to M. L. Padgett whose telephone number is (703) 308-2336 or after mid December (571) 272-1425. The examiner can generally be reached on Monday-Friday from about 8:30 a.m. to 4:30 p.m.; and fax phone numbers are (703) 872-9310 (regular); (703) 872-9311 (after final); and (703) 305-6078 (unofficial).

M.L. Padgett/dh
October 28, 2003

November 4, 2003

A handwritten signature in cursive script, appearing to read "Marianne Padgett", with a long horizontal flourish extending to the right.

**MARIANNE PADGETT
PRIMARY EXAMINER**